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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/839,940	04/20/2001	Ronald Dean Watkins	RD-29,211	4093

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EXAMINER	
FEICK, EMILY	
ART UNIT	**PAPER NUMBER**
2862	

DATE MAILED: 06/11/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

AIC

Office Action Summary	Application No. 09/839,940	Applicant(s) WATKINS ET AL.	
	Examiner Emily J. Feick	Art Unit 2862	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-17 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-17 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: Figure 1 includes the reference character "18" but does not disclose it in the written description. Correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in-
> (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or
> (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

2. Claims 1-4, 6, 8-12, 14-17 are rejected under 35 U.S.C. 102(e) as being unpatentable by U.S. Patent No. 6,285,189 to Wong.

In reference to claim 1, Wong discloses a radio frequency coil assembly for a very high field MRI system comprising: a plurality of conductors arranged cylindrically and disposed about a patient bore tube of the MRI system, said conductors having a width selected for said RF coil assembly to resonate at substantially high frequencies (col. 7, lines 59-60); and, a plurality of

capacitive elements for electrically interconnecting said plurality of conductors at respective ends of said conductors (col. 12, lines 62-65).

As to claim 2, Wong teaches the RF coil assembly of claim 1 wherein the width of the conductors is selected in accordance with: $w_{max} = 2\pi*A/N$ where w_{max} is the maximum width, A is the outer diameter radius of said patient bore tube and N is the number of said conductors (col. 5, line 22).

As to claim 3, Wong discloses the RF coil assembly of claim 1 wherein said substantially high frequencies occurs in a range between about 64 MHz to about 500 MHz (col. 8, line 41).

In reference to claim 4, Wong teaches the RF coil assembly coil of claim 2 wherein said width is about 7.9cm (Table 2), and said number of conductors is 16 (Tables 1 and 2; col. 2, lines 4-5).

In reference to claim 6, Wong teaches the RF coil assembly of claim 1 wherein said plurality of conductors have a selectable length (col. 10, lines 65-66).

As to claim 8, Wong teaches the RF coil assembly of claim 1 wherein said capacitive elements are low inductance end ring capacitors (col. 1, lines 54-65).

In reference top claim 9, Wong discloses the RF coil assembly of claim 1 wherein said conductors further include segmented slots for reducing eddy currents induced by gradient coils of said MRI system (col. 2, lines 58-63).

As to claim 10, Wong discloses the RF coil assembly of claim 1 further comprising a plurality of gaps disposed between said conductors (col. 14, lines 63-65).

In reference to claim 11, Wong discloses a very high MRI system comprises: a RF coil assembly adapted to resonate at high frequencies (col. 7, lines 59-60); a RF coil shield assembly

adapted to reduce the inductance of the conductors contained within the RF coil assembly (col. 13, lines 40-43); and, a RF drive cable assembly adapted to electrically connect to the RF coil assembly (Figure 1).

As to claim 12, Wong teaches the MRI system of claim 11 wherein said substantially high frequencies occur in the range of about 64 and 500 MHz (col. 8, line 41).

As to claim 14, Wong discloses the MRI system of claim 11 wherein the RF coil assembly comprises: a plurality of conductors arranged cylindrically and disposed about a patient bore tube of the MRI system, said conductors having a width selected for said RF coil assembly to resonate at substantially high frequencies (col. 7, lines 59-60); and, a plurality of capacitive elements for electrically interconnecting said plurality of conductors at respective ends of said conductors (col. 12, lines 62-65).

In reference to claim 15, Wong teaches the MRI system of claim 11 wherein said plurality of conductors and plurality of capacitive elements are adapted to form a band pass RF coil assembly configuration (col. 1, lines 60-62).

As to claim 16, Wong discloses the MRI system of claim 11 wherein said plurality of conductors and plurality of capacitive elements are adapted to form a low pass RF coil assembly configuration (col. 1, lines 60-62; Figure 2A).

In reference to claim 17,Wong teaches the MRI system of claim 11 wherein said plurality of capacitive elements form a high pass RF coil assembly configuration (col. 1, lines 60-62; Figure 2c).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wong.

As to claim 7, Wong discloses the RF coil assembly of claim 6 but does not teach that the selectable length is about 55cm. However, Wong does teach that the RF coil assembly disclosed in claim 6 may be used in medical imaging of humans (col. 1, lines 42-43). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention that it would be possible to modify the length of the RF coil assembly of claim 6 to have the length of 55cm or any other length that is adequate to perform medical imaging on various body parts.

Claims 5 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wong in view of Magnetic Resonance Imaging to Bushong.

In reference to claim 5, Wong teaches the RF coil assembly of claim 1 but does not teach that the high field MRI system produces a magnetic field of about 3 Tesla. However, Bushong does teach that the upper limit for the magnetic field in MR imagers is about 4 Tesla (Table 11-3, pg. 137). Bushong discloses that higher magnetic fields are beneficial in order to achieve desired signal-to-noise ratios that result in shorter examination times and reduced motion artifacts (pg. 138). Therefore, it would have been obvious at the time of the invention for one of ordinary skill

in the art to modify the RF coil assembly disclosed in claim 1 to produce a magnetic field of about 3 Tesla in order to produce higher signal-to-noise ratios.

As to claim 13, Wong teaches the MRI system of claim 11 but does not teach that the very high field MRI system produces a magnetic field of about 3 Tesla. However, Bushong does teach that the upper limit for the magnetic field in MR imagers is about 4 Tesla (Table 11-3, pg137). As discussed above, Bushong discloses that higher magnetic fields are beneficial in order to achieve desired signal-to-noise ratios that result in shorter examination times and reduced motion artifacts (pg. 138). Therefore, it would have been obvious at the time of the invention for one of ordinary skill in the art to modify the RF coil assembly disclosed in claim 1 to produce a magnetic field of about 3 Tesla in order to produce higher signal-to-noise ratios.

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patent No. 4,680,548 to Leussier and U.S. Patent No. 4,680,548 to Edelstein et al. disclose a radio frequency coil assembly for a very high field MRI system.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Emily J. Feick whose telephone number is (703)-305-4450. The examiner can normally be reached on Monday-Friday, 9:00-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Lefkowitz can be reached on (703)-305-4816. The fax phone numbers for

the organization where this application or proceeding is assigned are (703)-305-3432 for regular communications and (703)-308-0956 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)-308-1782.

Emily Feick

EJF
June 6, 2002

EDWARD LEFKOWITZ
SUPERVISORY PATENT EXAMINER
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